

ELECTRICAL ENGINEERING, MS

Banner Code: VS-MS-ELEN

Academic Advising

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The electrical engineering program offers the following specialization areas: bioengineering, communications and networking, signal processing, control and robotics, microelectronics/nanoelectronics, and system architectures.

Admissions & Policies

Admissions

Categories of Admission

Each student may be admitted into one of the following categories: degree, provisional, or nondegree. Provisional admission is for anyone whose past performance provides reasonable, but not strong, evidence of ability to pursue graduate work. To advance to degree status, a provisional student must achieve a 3.00 GPA after 12 credits, remove all undergraduate deficiencies by completing the corresponding courses with grades of B or better, and receive a B or better in two core courses specific to the student's selected program and specialization. The nondegree category is used primarily by students who want to take courses but not necessarily pursue a degree. Nondegree students seeking to enter degree programs must formally apply for admission.

Requirements

To be considered for admission to the master's program, applicants should have a baccalaureate degree in electrical engineering, computer engineering, or a closely-related discipline from an accredited program with a reputation for high academic standards, and have earned a GPA of B or better during the last 60 credits. Other requirements are as follows:

- Two letters of recommendation, preferably from academic references or references in industry or government who hold advanced degrees and are familiar with the applicant's professional accomplishments
- Resume and detailed statement of career goals and aspirations
- For students who have not earned a bachelor's degree from a U.S. university, satisfactory performance on the GRE
- For students whose native language is not English, a minimum TOEFL score of 575 for the paper-based exam or 230 for the computer-based exam. A minimum score of 600 for the paper-based exam or 250 for the computer-based exam is required for applicants who wish to be considered for a graduate teaching assistantship.

Non-ECE Students

Students with BS or MS degrees in ECE-related disciplines (for example, computer science, mathematics, mechanical engineering, physics, or electrical engineering technology) are encouraged to apply for admission.

They may initially be admitted into the provisional category and advance to degree status by satisfying requirements described in the Admissions Categories section. Such students may also be advised to take some courses from the undergraduate electrical or computer engineering curriculum, according to their intended specialization and specific backgrounds.

Policies

Student Advising

Newly-admitted graduate students must consult with the ECE graduate coordinator before they register for classes. Students should make an appointment by calling the ECE office. Students are expected to select a specialization from those available in each MS degree program. Students then are assigned an academic advisor from that specialization.

GPA Requirements

A maximum of 6 credits of courses with grades of C or B- may be applied toward the degree. The student must present a GPA of at least 3.00 for all courses submitted for the degree.

Requirements

Degree Requirements

Total credits: 30

Students must complete a minimum of 30 graduate credits beyond the bachelor's degree. This work must represent a cohesive set of courses leading to comprehensive knowledge in one area; it cannot be a set of disjointed courses. The plan of study for the degree must include the following:

Plan of Study

Before the end of the second semester, each student must submit to the graduate coordinator's office a plan of study that has been approved by the academic advisor. This plan should be kept up to date by regular consultation with the academic advisor. A final, signed version of the plan must be turned in when the student submits a graduation application.

Core Courses

Select two courses from the following: ¹		6
ECE 521	Modern Systems Theory	
ECE 528	Introduction to Random Processes in Electrical and Computer Engineering	
ECE 548 or ECE 511	Sequential Machine Theory Microprocessors	
ECE 584 or ECE 565	Semiconductor Device Fundamentals Introduction to Optical Electronics	
Total Credits		6

¹ Must earn a B or better in each.

Upper Level Courses

Three courses at the 600 level or above. ¹	9
Total Credits	9

¹ Students must earn a B or better in each course. Must be a coherent set of courses, not including ECE 798 Research Project or ECE 799 Master's Thesis. For guidance for selecting a coherent set of courses, students are referred to the courses listed for each of the program's specialization areas listed on the ECE website. A maximum of 6 credits of non-ECE courses may be used, subject to prior department approval.

Seminar Requirement

Graduate students are expected to participate actively in the exchange of knowledge and ideas in their discipline. Towards this objective, all degree candidates must attend a minimum of 6 graduate seminars approved for the degree program. Approved seminars are publicized on the departmental webpage.

To demonstrate completion of the seminar requirement, students must register for ECE 795 Engineering Seminar in their final semester. The department office will verify that the seminar requirement has been met and submit a grade of S (satisfactory) upon completion of the requirement. Students who have not met the seminar requirement in their final semester must continue to register for ECE 795 Engineering Seminar in subsequent semesters until the requirement is met.

Thesis/Scholarly Paper Option

To complete the program, students may select one of the following options:

Thesis Option

Students who select this option must complete:

Code	Title	Credits
ECE 799	Master's Thesis	6
Coursework		24
Total Credits		30

The thesis is particularly recommended for those students who wish to develop and document their research skills or contemplate subsequent enrollment in a PhD program. The thesis involves a research effort, which is conducted under the guidance of a faculty advisor. In some cases, permission may be granted to complete a portion of the work at the student's place of employment. The final written thesis and oral defense are approved by the student's advisory committee.

For the Electrical Engineering program, this committee consists of at least three full-time faculty members, including two from the student's major specialization, and one from outside the specialization. For the Computer Engineering Program, this committee consists of at least three full-time faculty members, including two affiliated with the MS in Computer Engineering Program, one of whom must be from the ECE Department. Thesis students may not register for ECE 798 Research Project. Students must register for at least 3 credits of thesis for their first thesis semester. Following their first thesis semester, they must register for at least 1 credit of thesis each fall and spring semester until graduation.

Scholarly Paper Option

Students who select to complete their degree program with a scholarly paper must:

Code	Title	Credits
Complete 30 credits of coursework		30
ECE 797	Scholarly Paper	0

Enroll in a 600-level or above course requiring a research project

Write a Scholarly Paper project report and present findings as part of the course requirements

Total Credits 30

An acceptable scholarly paper must be technically sound, adhere to accepted formatting standards for technical reports, and contain a significant literature review evidenced by a comprehensive list of cited references.

A list of courses requiring projects that can be used to satisfy the scholarly paper requirement will be published on the department website. Scholarly papers must be individual written project reports – not group projects. To qualify as a scholarly paper an oral presentation of the project is required. A passing grade for the project, reflecting both the written report and the oral presentation, satisfies the scholarly paper requirement.

A successful scholarly paper will be recorded by awarding a satisfactory (S) grade for ECE 797 Scholarly Paper. Students are eligible to attempt the scholarly paper and register for ECE 797 Scholarly Paper after completion of 18 hours of coursework. Students choosing the scholarly paper option are not eligible for graduation until they have received a final, passing grade for ECE 797 Scholarly Paper.

Accelerated Master's

Electrical Engineering, BS/Electrical Engineering, Accelerated MS

Overview

Highly-qualified students in the Electrical Engineering, BS have the option of obtaining an accelerated Electrical Engineering, MS.

For more detailed information, see AP.6.7 Bachelor's/Accelerated Master's Degrees. For policies governing all graduate degrees, see AP.6 Graduate Policies.

Admission Requirements

Students in the Electrical Engineering, BS program may apply to this option if they have earned 90 undergraduate credits with an overall GPA of 3.25. Criteria for admission are identical to criteria for admission to the Electrical Engineering, MS program.

Accelerated Option Requirements

Students must complete all credits that satisfy the requirements for the BS and MS programs, with 6 credits overlap.

Students take 6 credits of 500-level courses as part of their technical electives or substitutes for required courses as part of their 121-credit undergraduate program. The specific courses that may be taken and applied to the accelerated program will be specified by the ECE Department.

Students admitted to the accelerated program must maintain an overall GPA of at least 3.25 during the entire BS/MS program and present a GPA of at least 3.25 for the 24 credits of graduate work submitted for the MS degree.

Students may take additional graduate-level courses as part of their BS technical electives with advisor approval. These additional graduate-level courses will not count toward the MS degree.

Degree Conferral

Students must apply the semester before they expect to complete the BS requirements to have the BS degree conferred. In addition, at the beginning of the student's final undergraduate semester, students must complete a Bachelor's/Accelerated Master's Transition form that is submitted to the Office of the University Registrar and the VSE Graduate Admissions Office. At the completion of MS requirements, a master's degree is conferred.